

Our Ref: 1269/2/SJG

Your Ref:

17th January 2025

Ramsden Farm Developments
c/o Unit 6
3a Edgar Street
M40 1EP.

Dear Kevin and Terry,

Re: Proposed Further Residential Development Plots 5, 6 and 7 at Ramsden Farm, Middleton M24 1FT - Brief FRA and Outline Drainage Strategy

Further residential development is proposed at the above site consisting of three more plots 5, 6 and 7 houses with associated gardens and driveways. The site is approx. 0.32 hectares and is currently unoccupied but was previously part of Ramsden Farm.

In accordance with the local authorities planning requirements, a surface water drainage strategy and SuDS assessment are required for major developments or sites in critical drainage areas. A Brief FRA and an outline drainage strategy has been carried out for the above site in accordance with Planning Policy Guidance ID7 Flood Risk and Coastal Change and SuDS guidance based on the development proposals provided.

The Environment Agency (EA) Flood Risk Maps indicate that the site is in Flood Zone 1. Flood Zone 1 is classified as having a low probability of flooding with a flood risk of less than 1 in 1000. The development site area is approx. 0.32 hectares and is less than 1 hectare and therefore a Flood Risk Assessment shouldn't be required unless it is in a critical drainage area, this should be confirmed with the LLFA. The EA Surface Water Flood Risk Maps indicate very low risk of surface water flooding on the site.

In accordance with PPG ID7 and SuDS and surface water hierarchy guidance, surface water run-off from new developments should not exceed existing run-off rates and should provide a 30% or 50% reduction in flows dependant on whether it is in a critical drainage area and SuDS and greenfield run-off rates should be implemented where possible. Foul drainage should discharge to a public sewer and surface water drainage should discharge to sustainable urban drainage systems (SuDS), if these are not suitable to a nearby watercourse, if not present to a surface water sewer and if not present to a combined sewer as a last resort.

With regards to the SuDS assessment, the use of sustainable drainage systems (SuDS) such as soakaways, permeable pavements, infiltration basins, ponds, swales, rain

gardens and tree pits should be incorporated where possible into the surface water drainage design to reduce surface water runoff from the development. Site Investigations should be carried out to confirm the ground conditions and soakaway tests should be carried out in accordance with BRE365 to determine infiltration co-efficients to confirm whether the site is suitable for infiltration methods of SuDS. Should these prove inadequate, permeable pavements, basins, ponds, swales, rain gardens and tree pits and cellular storage should still be considered for attenuation and to slow down flows.

The foul drainage from the site should discharge to the nearest available foul sewer which is the 150mm diameter foul sewer in Ramsden Farm Road which serves the previous four plots and discharges to the 450mm diameter public combined sewer in Roundthorn Road. Responsibility for maintaining private sewers that serve more than one property transferred to the sewage companies from 1st October 2011 and a private sewer is classed as a shared sewer from the point where it serves more than one property and therefore as the foul sewer in Ramsden Farm Road serves the previous plots, it should be United Utilities responsibility. This should be confirmed with United Utilities.

British Geological Society (BGS) Geology Maps indicate Devensian Sand and Gravel drift deposits over Pennine Lower Coal Measures Formation as mudstone, siltstone and sandstone solid deposits recorded to be present beneath the site. The sand and gravel drift deposits are likely to have adequate infiltration co-efficients for soakaways and infiltration permeable pavements or other infiltration SuDS but ground conditions should be confirmed and soakaway tests should be carried out in accordance with BRE365 to determine infiltration co-efficients and confirm whether the site is suitable for infiltration methods of SuDS.

Should discharge into the ground not be possible, the surface water should discharge to the nearest available watercourse, which is Wince Brook approx. 100m northeast of the site. Flow rates should be limited by flow control devices to 50% of pre-development flows or greenfield run off or the minimum flow of approx. 5 l/s from a minimum 100mm size flow control to prevent blockages. If the site has no existing surface water discharge to the watercourse, the flow should be limited to greenfield run-off. The Greenfield run off rates for the site are QBAR 2.1 l/s, Q1 year 1.9 l/s, Q30 years 3.6 l/s and Q100 years 4.4 l/s, therefore as the greenfield run off rates are so low, the flow should be limited to the minimum flow of approx. 5 l/s from a minimum 100mm size flow control to prevent blockages. SuDS such as permeable pavements, infiltration basins, ponds, swales, rain gardens and tree pits should be incorporated where possible into the drainage design and attenuation provided within the drainage system for storms up to 30 years plus a 40% allowance for climate change and within the site using SuDS as attenuation for storms up to 100 year plus a 45% allowance for climate change in accordance with planning policy guidance and the local authority and United Utilities requirements and subject to agreement with the local authority and United Utilities.

Soakaway tests were carried out by Rainwater Harvesting Ltd. for their Rain Block Crate Soakaway System in August 2019 for the previous four plots constructed on the site in accordance with BRE 365 and soakaways were designed for the plots based on the lowest infiltration rate of 0.0244 m/hr for storms up to 100 year plus a 40% allowance for climate change. It was therefore assumed that soakaways would be suitable for the proposed further three plots, but it was recommended that further soakaway tests should be carried out in the locations proposed for the soakaways for the three plots 5, 6 and 7.

A Soakaway Investigation was carried out by Abbeydale GeoScience in December 2024 and their Report Ref: 744045-SI-2, dated 13th January should be referred to for further information. Three trial pits were excavated in each plots garden where it was proposed to locate the soakaways and trial pits TP1 and TP3 in plot 5 and plot 7 respectively identified topsoil to 0.6m over sand drift deposits to 2.0m deep. Trial pit TP2 in plot 6 identified made ground consisting of sand, gravel, brick, glass, wood and sandstone to 2.0m deep. No groundwater was encountered in the trial pits. The trial pits were consistent with the previous site investigation carried out on the site for the previous plots and excavations carried out on site during the construction of the previous plots which identified topsoil and made ground over sand drift deposits to depths of 2 to 3m and no groundwater encountered. The site investigation has confirmed that the made ground identified in Plot 6 appears to be an isolated area of made ground, but it was not considered suitable for a soakaway test or to locate a soakaway in this area. Soakaway tests were carried out in TP1 and TP3 in plot 5 and plot 7 respectively in general accordance with BRE 365 as stated in the report and infiltration rates of 3.0×10^{-5} m/s and 4.77×10^{-5} m/s were calculated and the worst-case infiltration rate of 3.0×10^{-5} m/s was recommended for design purposes. This equates to an infiltration rate of 0.108 m/hr. However, due to the issues encountered during the soakaway tests with the collapse of the sand, the more conservative lowest infiltration rate of 0.0244 m/hr from the previous investigation for the previous plots where the tests were able to be fully completed in accordance with BRE 365 should be used for soakaway design purposes.

Soakaways have been modelled for the rainwater run-off from the approx. roof areas of plot 5 and 6 and the approx. roof area of plot 7 and a permeable pavement for Plot 7 has been modelled for the approx. 60 sq.m parking areas shown for each plot for the proposed development in micro drainage source control SuDS design software for storms up to 100 years with an allowance of 45% for climate change in accordance with planning guidance using the more conservative lowest infiltration rate of 0.0244 m/hr from all of the soakaway tests carried out at the site and the results enclosed indicate that no flooding occurs. Soakaways and permeable pavements are therefore considered suitable for the proposed development but the drainage details, surface water run-off areas and levels should be confirmed during the detailed drainage and soakaway design stage.

Residual overland flood routes should be assessed and emergency access and egress routes should be provided and these and the floor levels of the proposed properties

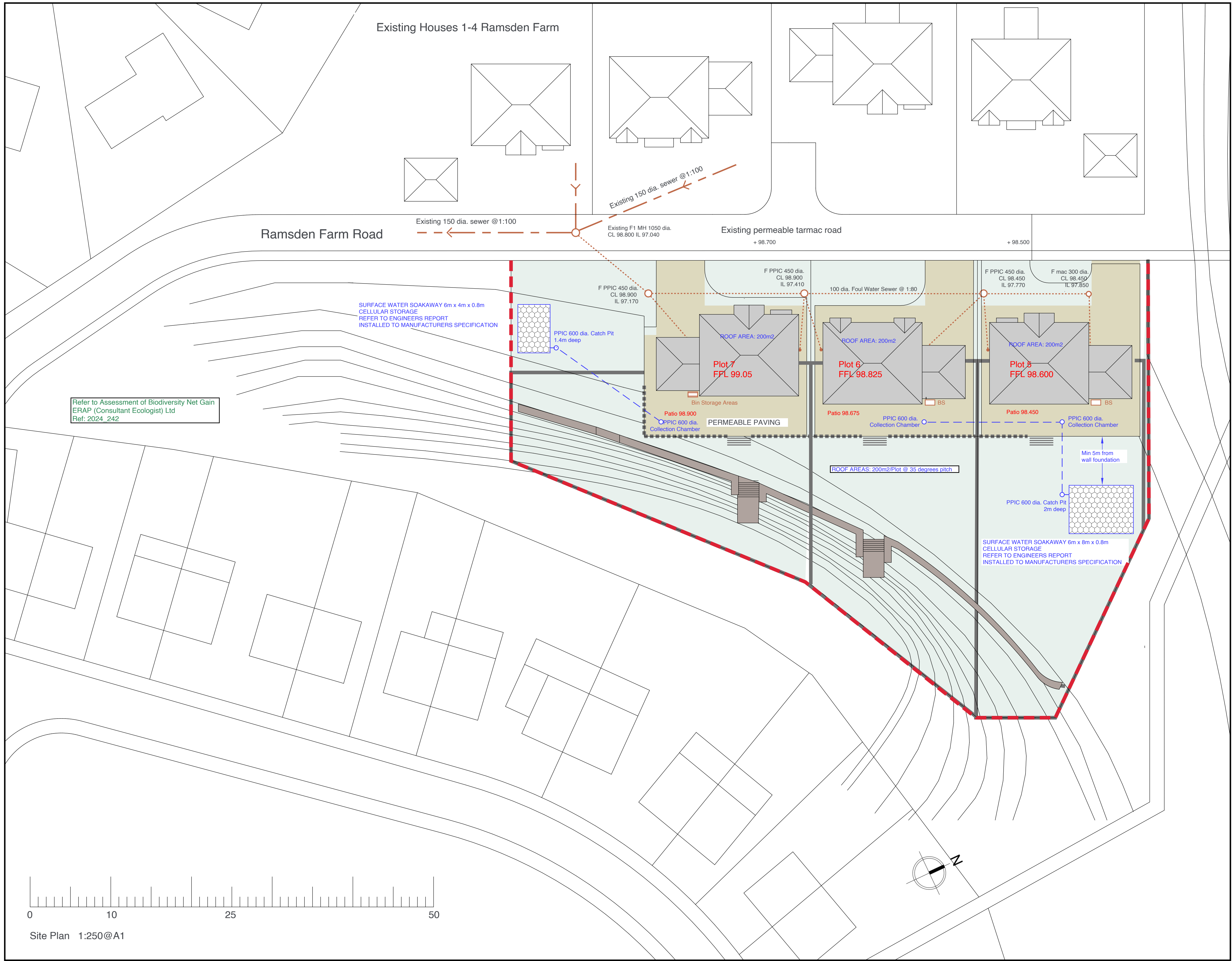
should be set above residual flood levels to reduce the risk to homeowners and flooding of the properties.

Should you require any further information or if you would like to discuss anything please do not hesitate to contact me.

Yours sincerely,

Sarah Griggs

For and on behalf of Build Vision



DRAINAGE: FOUL WATER SYSTEM TO DISCHARGE INTO THE EXISTING SEWER IN RAMSDEN FARM ROAD
SURFACE WATER TO DISCHARGE TO NEW SOAKAWAYS.

ALL INVERTS AND DIMENSIONS MUST BE CHECKED ON SITE

ALL DRAINAGE INSTALLED IN ACCORDANCE WITH REGULATIONS AND TO MATCH THE EXISTING PHASE 1 DRAINAGE TO PLOTS 1-4

- SOFT LANDSCAPING TO LANDSCAPE ARCHITECTS PLAN
- GABION BASKET RETAINING WALLS
- PERMEABLE PAVING: MARSHALLS TEGULA PRIORA

Refer to Landscape Design
Trevor Bridge Associates Ltd
Ref: 7515.01/02A

Refer to Arboricultural Impact Assessment
Bowland Tree Consultancy Ltd
Ref: BTC3007

Refer to Assessment of Biodiversity Net Gain
ERAP (Consultant Ecologist) Ltd
Ref: 2024_242

A:DRAINAGE 14/01/2025 REFER TO
ENGINEERS DRAINAGE STRATEGY



1M high gabion basket retaining walls



Patio and garden walls in facing bricks with stone copings to match the houses.



1.8m high close boarded timber fence to match the existing boundary fences to Plots 1-4

Shown here with Marshalls Tegula Paving

Flood map for planning

Your reference
Ramsden Farm

Location (easting/northing)
387704/405385

Created
15 Jan 2025 16:11

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2024 OS AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
Ramsden Farm

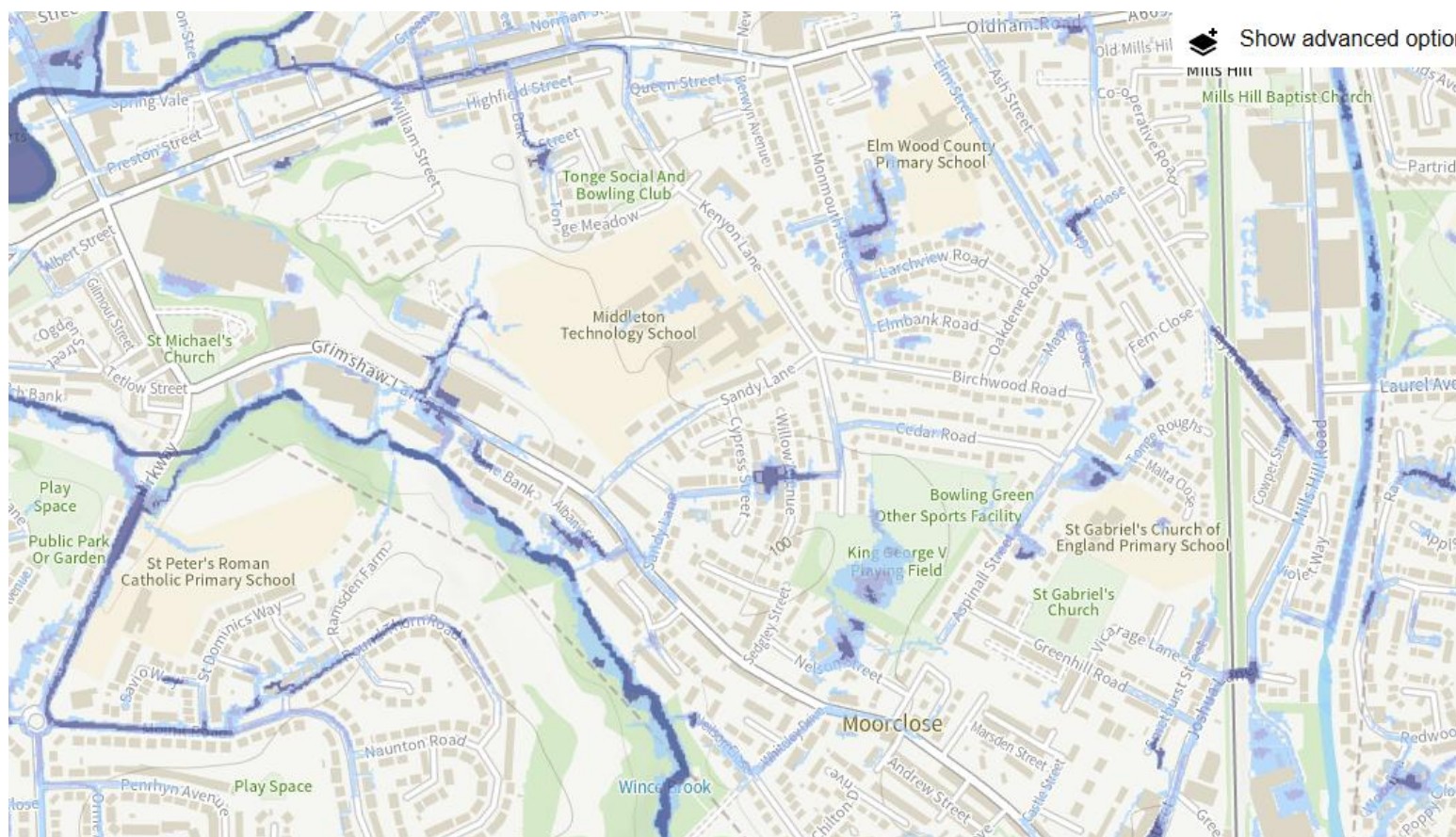
Location (easting/northing)
387704/405385

Scale
1:2500

Created
15 Jan 2025 16:11

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area


0 20 40 60m



Key

Surface water

● Extent

■ High

More than 3.3% chance each year

■ Medium

Between 1% and 3.3% chance each year

■ Low

Between 0.1% and 1% chance each year

○ Depth

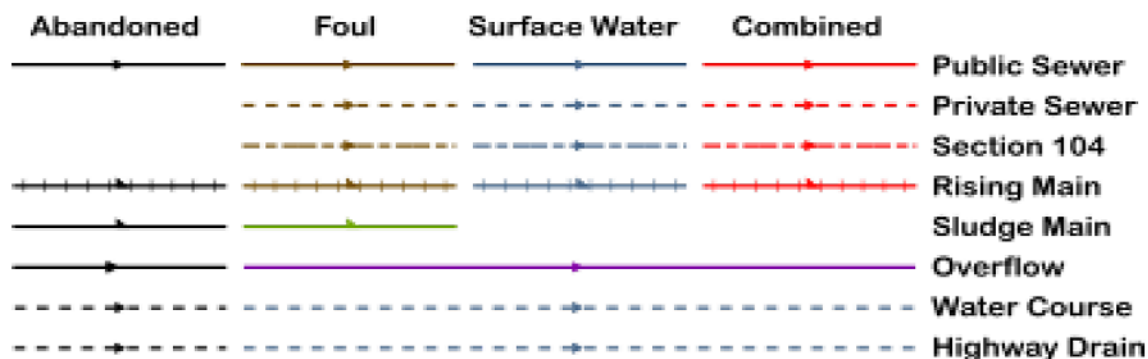
Map details

☒ Show flooding

☐ Selected address

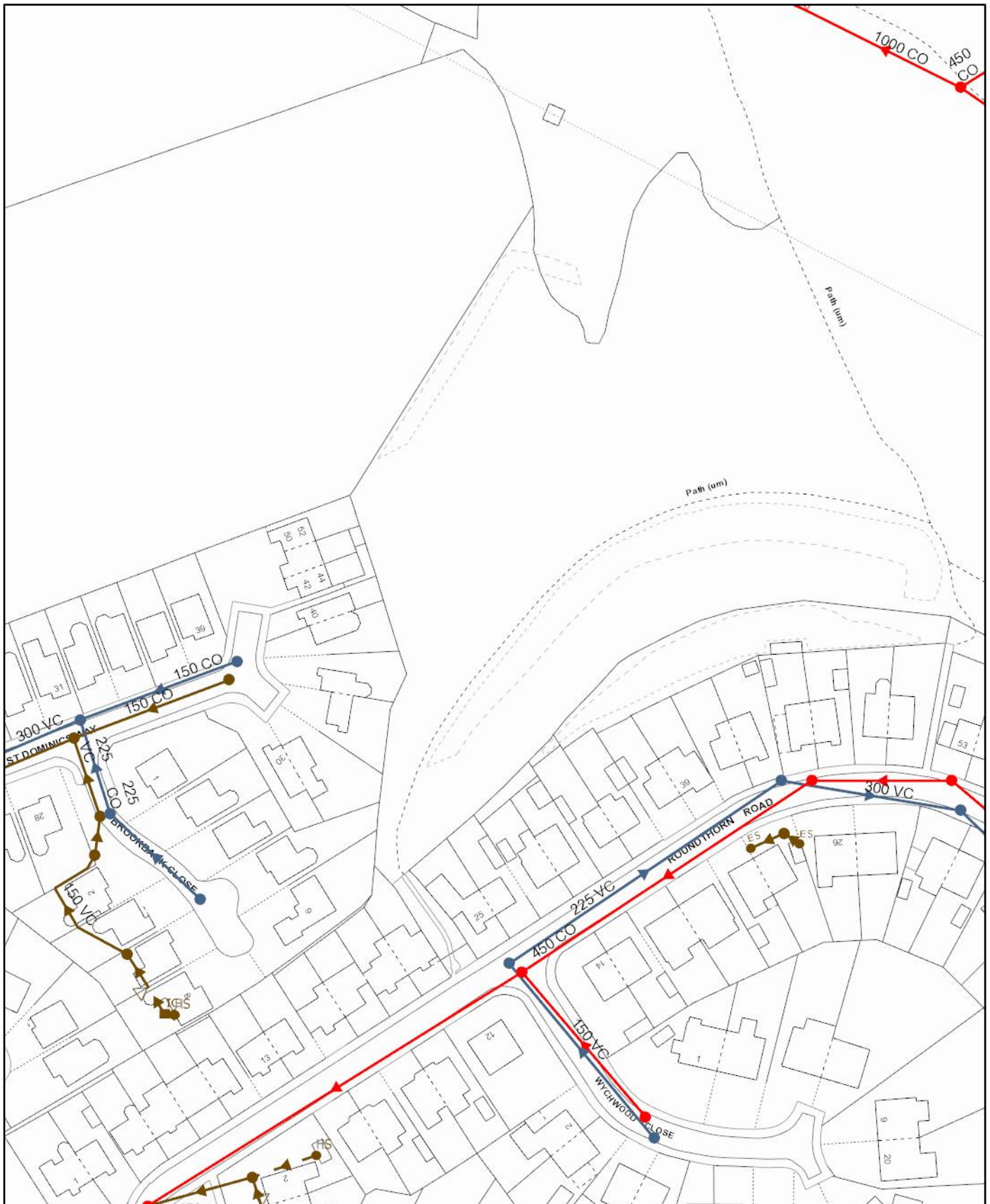
● 15m boundary

Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	
Drop Shaft	Change of Characteristic
Orifice Plate	



Scale: 1:1250
Date: 05/11/2019

SEWER RECORDS

Address or Site Reference: 23 ROUNDTORN ROAD, MIDDLETON,
MANCHESTER, M24 1FT

Printed by: Property Searches



The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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BV Consulting		Page 1
8 Westleigh House Denby Dale Huddersfield		
Date 15/01/2025 14:23 File	Designed by User Checked by	
Micro Drainage		Source Control 2020.1.3
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.450 Area (ha) 0.320 Urban 0.000 SAAR (mm) 1000 Region Number Region 10 Results l/s QBAR Rural 2.1 QBAR Urban 2.1 Q100 years 4.4 Q1 year 1.9 Q30 years 3.6 Q100 years 4.4		
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BV Consulting			Page 1		
8 Westleigh House Denby Dale Huddersfield		Ramsden Farm Plot 5 and 6			
Date 15/01/2025 15:54 File SOAKAWAY PLOT 5 AND 6.SRCX		Designed by Sarah Griggs Checked by			
Micro Drainage		Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+45%)					
Half Drain Time : 1247 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	97.696	0.196	0.2	8.9	0 K
30 min Summer	97.768	0.268	0.2	12.2	0 K
60 min Summer	97.849	0.349	0.2	15.9	0 K
120 min Summer	97.935	0.435	0.2	19.8	0 K
180 min Summer	97.982	0.482	0.2	22.0	0 K
240 min Summer	98.010	0.510	0.2	23.3	0 K
360 min Summer	98.050	0.550	0.2	25.1	0 K
480 min Summer	98.073	0.573	0.2	26.1	0 K
600 min Summer	98.087	0.587	0.2	26.7	0 K
720 min Summer	98.094	0.594	0.2	27.1	0 K
960 min Summer	98.097	0.597	0.2	27.2	0 K
1440 min Summer	98.091	0.591	0.2	26.9	0 K
2160 min Summer	98.071	0.571	0.2	26.1	0 K
2880 min Summer	98.049	0.549	0.2	25.0	0 K
4320 min Summer	98.002	0.502	0.2	22.9	0 K
5760 min Summer	97.958	0.458	0.2	20.9	0 K
7200 min Summer	97.916	0.416	0.2	19.0	0 K
8640 min Summer	97.877	0.377	0.2	17.2	0 K
10080 min Summer	97.841	0.341	0.2	15.5	0 K
15 min Winter	97.719	0.219	0.2	10.0	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	121.169	0.0	23		
30 min Summer	83.539	0.0	37		
60 min Summer	55.087	0.0	66		
120 min Summer	35.030	0.0	126		
180 min Summer	26.417	0.0	186		
240 min Summer	21.426	0.0	246		
360 min Summer	15.988	0.0	364		
480 min Summer	12.960	0.0	482		
600 min Summer	11.001	0.0	602		
720 min Summer	9.615	0.0	722		
960 min Summer	7.767	0.0	930		
1440 min Summer	5.734	0.0	1152		
2160 min Summer	4.222	0.0	1540		
2880 min Summer	3.391	0.0	1960		
4320 min Summer	2.485	0.0	2772		
5760 min Summer	1.997	0.0	3584		
7200 min Summer	1.685	0.0	4392		
8640 min Summer	1.467	0.0	5184		
10080 min Summer	1.306	0.0	5952		
15 min Winter	121.169	0.0	22		
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8 Westleigh House Denby Dale Huddersfield		Ramsden Farm Plot 5 and 6				
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Micro Drainage		Source Control 2020.1.3				
Summary of Results for 100 year Return Period (+45%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
30 min Winter	97.801	0.301	0.2	13.7	0 K	
60 min Winter	97.893	0.393	0.2	17.9	0 K	
120 min Winter	97.990	0.490	0.2	22.3	0 K	
180 min Winter	98.044	0.544	0.2	24.8	0 K	
240 min Winter	98.078	0.578	0.2	26.3	0 K	
360 min Winter	98.125	0.625	0.2	28.5	0 K	
480 min Winter	98.154	0.654	0.2	29.8	0 K	
600 min Winter	98.172	0.672	0.2	30.7	0 K	
720 min Winter	98.184	0.684	0.2	31.2	0 K	
960 min Winter	98.194	0.694	0.2	31.6	0 K	
1440 min Winter	98.185	0.685	0.2	31.3	0 K	
2160 min Winter	98.161	0.661	0.2	30.1	0 K	
2880 min Winter	98.129	0.629	0.2	28.7	0 K	
4320 min Winter	98.057	0.557	0.2	25.4	0 K	
5760 min Winter	97.990	0.490	0.2	22.3	0 K	
7200 min Winter	97.926	0.426	0.2	19.4	0 K	
8640 min Winter	97.867	0.367	0.2	16.7	0 K	
10080 min Winter	97.813	0.313	0.2	14.3	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
30 min Winter	83.539	0.0	37			
60 min Winter	55.087	0.0	66			
120 min Winter	35.030	0.0	124			
180 min Winter	26.417	0.0	182			
240 min Winter	21.426	0.0	240			
360 min Winter	15.988	0.0	358			
480 min Winter	12.960	0.0	474			
600 min Winter	11.001	0.0	588			
720 min Winter	9.615	0.0	700			
960 min Winter	7.767	0.0	922			
1440 min Winter	5.734	0.0	1326			
2160 min Winter	4.222	0.0	1648			
2880 min Winter	3.391	0.0	2112			
4320 min Winter	2.485	0.0	3028			
5760 min Winter	1.997	0.0	3872			
7200 min Winter	1.685	0.0	4688			
8640 min Winter	1.467	0.0	5528			
10080 min Winter	1.306	0.0	6264			
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8 Westleigh House Denby Dale Huddersfield	Ramsden Farm Plot 5 and 6	
Date 15/01/2025 15:54 File SOAKAWAY PLOT 5 AND 6.SRCX	Designed by Sarah Griggs Checked by	
Micro Drainage Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Shortest Storm (mins)	15
Ratio R	0.302	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.040

Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:
0	4 0.020	4	8 0.020

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8 Westleigh House Denby Dale Huddersfield	Ramsden Farm Plot 5 and 6	
Date 15/01/2025 15:54 File SOAKAWAY PLOT 5 AND 6.SRCX	Designed by Sarah Griggs Checked by	
Micro Drainage	Source Control 2020.1.3	

Model Details

Storage is Online Cover Level (m) 99.500

Cellular Storage Structure

Invert Level (m) 97.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.02448 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.02448

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	48.0	48.0	0.801	0.0	70.4
0.800	48.0	70.4			

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8 Westleigh House Denby Dale Huddersfield		Ramsden Farm Plot 7																																																																																																																																																																																																																					
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K</td></tr><tr><td>600 min Summer</td><td>97.977</td><td>0.577</td><td>0.1</td><td>13.2</td><td>0 K</td></tr><tr><td>720 min Summer</td><td>97.983</td><td>0.583</td><td>0.1</td><td>13.3</td><td>0 K</td></tr><tr><td>960 min Summer</td><td>97.984</td><td>0.584</td><td>0.1</td><td>13.3</td><td>0 K</td></tr><tr><td>1440 min Summer</td><td>97.977</td><td>0.577</td><td>0.1</td><td>13.2</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>97.957</td><td>0.557</td><td>0.1</td><td>12.7</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>97.933</td><td>0.533</td><td>0.1</td><td>12.2</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>97.885</td><td>0.485</td><td>0.1</td><td>11.0</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>97.840</td><td>0.440</td><td>0.1</td><td>10.0</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>97.798</td><td>0.398</td><td>0.1</td><td>9.1</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>97.759</td><td>0.359</td><td>0.1</td><td>8.2</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>97.723</td><td>0.323</td><td>0.1</td><td>7.4</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>97.620</td><td>0.220</td><td>0.1</td><td>5.0</td><td>0 K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>121.169</td><td>0.0</td><td>19</td></tr><tr><td>30 min Summer</td><td>83.539</td><td>0.0</td><td>34</td></tr><tr><td>60 min Summer</td><td>55.087</td><td>0.0</td><td>64</td></tr><tr><td>120 min Summer</td><td>35.030</td><td>0.0</td><td>124</td></tr><tr><td>180 min Summer</td><td>26.417</td><td>0.0</td><td>182</td></tr><tr><td>240 min Summer</td><td>21.426</td><td>0.0</td><td>242</td></tr><tr><td>360 min Summer</td><td>15.988</td><td>0.0</td><td>362</td></tr><tr><td>480 min Summer</td><td>12.960</td><td>0.0</td><td>482</td></tr><tr><td>600 min Summer</td><td>11.001</td><td>0.0</td><td>600</td></tr><tr><td>720 min Summer</td><td>9.615</td><td>0.0</td><td>720</td></tr><tr><td>960 min Summer</td><td>7.767</td><td>0.0</td><td>856</td></tr><tr><td>1440 min Summer</td><td>5.734</td><td>0.0</td><td>1110</td></tr><tr><td>2160 min Summer</td><td>4.222</td><td>0.0</td><td>1512</td></tr><tr><td>2880 min Summer</td><td>3.391</td><td>0.0</td><td>1928</td></tr><tr><td>4320 min Summer</td><td>2.485</td><td>0.0</td><td>2728</td></tr><tr><td>5760 min Summer</td><td>1.997</td><td>0.0</td><td>3568</td></tr><tr><td>7200 min Summer</td><td>1.685</td><td>0.0</td><td>4328</td></tr><tr><td>8640 min Summer</td><td>1.467</td><td>0.0</td><td>5104</td></tr><tr><td>10080 min Summer</td><td>1.306</td><td>0.0</td><td>5856</td></tr><tr><td>15 min Winter</td><td>121.169</td><td>0.0</td><td>19</td></tr></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	97.596	0.196	0.1	4.5	0 K	30 min Summer	97.668	0.268	0.1	6.1	0 K	60 min Summer	97.749	0.349	0.1	8.0	0 K	120 min Summer	97.834	0.434	0.1	9.9	0 K	180 min Summer	97.880	0.480	0.1	10.9	0 K	240 min Summer	97.908	0.508	0.1	11.6	0 K	360 min Summer	97.945	0.545	0.1	12.4	0 K	480 min Summer	97.966	0.566	0.1	12.9	0 K	600 min Summer	97.977	0.577	0.1	13.2	0 K	720 min Summer	97.983	0.583	0.1	13.3	0 K	960 min Summer	97.984	0.584	0.1	13.3	0 K	1440 min Summer	97.977	0.577	0.1	13.2	0 K	2160 min Summer	97.957	0.557	0.1	12.7	0 K	2880 min Summer	97.933	0.533	0.1	12.2	0 K	4320 min Summer	97.885	0.485	0.1	11.0	0 K	5760 min Summer	97.840	0.440	0.1	10.0	0 K	7200 min Summer	97.798	0.398	0.1	9.1	0 K	8640 min Summer	97.759	0.359	0.1	8.2	0 K	10080 min Summer	97.723	0.323	0.1	7.4	0 K	15 min Winter	97.620	0.220	0.1	5.0	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	121.169	0.0	19	30 min Summer	83.539	0.0	34	60 min Summer	55.087	0.0	64	120 min Summer	35.030	0.0	124	180 min Summer	26.417	0.0	182	240 min Summer	21.426	0.0	242	360 min Summer	15.988	0.0	362	480 min Summer	12.960	0.0	482	600 min Summer	11.001	0.0	600	720 min Summer	9.615	0.0	720	960 min Summer	7.767	0.0	856	1440 min Summer	5.734	0.0	1110	2160 min Summer	4.222	0.0	1512	2880 min Summer	3.391	0.0	1928	4320 min Summer	2.485	0.0	2728	5760 min Summer	1.997	0.0	3568	7200 min Summer	1.685	0.0	4328	8640 min Summer	1.467	0.0	5104	10080 min Summer	1.306	0.0	5856	15 min Winter	121.169	0.0	19
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status																																																																																																																																																																																																																		
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60 min Summer	97.749	0.349	0.1	8.0	0 K																																																																																																																																																																																																																		
120 min Summer	97.834	0.434	0.1	9.9	0 K																																																																																																																																																																																																																		
180 min Summer	97.880	0.480	0.1	10.9	0 K																																																																																																																																																																																																																		
240 min Summer	97.908	0.508	0.1	11.6	0 K																																																																																																																																																																																																																		
360 min Summer	97.945	0.545	0.1	12.4	0 K																																																																																																																																																																																																																		
480 min Summer	97.966	0.566	0.1	12.9	0 K																																																																																																																																																																																																																		
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120 min Summer	35.030	0.0	124																																																																																																																																																																																																																				
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360 min Summer	15.988	0.0	362																																																																																																																																																																																																																				
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8 Westleigh House Denby Dale Huddersfield		Ramsden Farm Plot 7			
Date 15/01/2025 15:41 File SOAKAWAY PLOT 7.SRCX		Designed by Sarah Griggs Checked by			
Micro Drainage		Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+45%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	97.701	0.301	0.1	6.9	0 K
60 min Winter	97.793	0.393	0.1	9.0	0 K
120 min Winter	97.889	0.489	0.1	11.1	0 K
180 min Winter	97.942	0.542	0.1	12.4	0 K
240 min Winter	97.974	0.574	0.1	13.1	0 K
360 min Winter	98.019	0.619	0.1	14.1	0 K
480 min Winter	98.046	0.646	0.1	14.7	0 K
600 min Winter	98.062	0.662	0.1	15.1	0 K
720 min Winter	98.071	0.671	0.1	15.3	0 K
960 min Winter	98.077	0.677	0.1	15.4	0 K
1440 min Winter	98.066	0.666	0.1	15.2	0 K
2160 min Winter	98.040	0.640	0.1	14.6	0 K
2880 min Winter	98.006	0.606	0.1	13.8	0 K
4320 min Winter	97.932	0.532	0.1	12.1	0 K
5760 min Winter	97.863	0.463	0.1	10.6	0 K
7200 min Winter	97.800	0.400	0.1	9.1	0 K
8640 min Winter	97.743	0.343	0.1	7.8	0 K
10080 min Winter	97.692	0.292	0.1	6.7	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	83.539	0.0	33		
60 min Winter	55.087	0.0	62		
120 min Winter	35.030	0.0	122		
180 min Winter	26.417	0.0	180		
240 min Winter	21.426	0.0	238		
360 min Winter	15.988	0.0	354		
480 min Winter	12.960	0.0	470		
600 min Winter	11.001	0.0	584		
720 min Winter	9.615	0.0	694		
960 min Winter	7.767	0.0	914		
1440 min Winter	5.734	0.0	1156		
2160 min Winter	4.222	0.0	1620		
2880 min Winter	3.391	0.0	2076		
4320 min Winter	2.485	0.0	2980		
5760 min Winter	1.997	0.0	3808		
7200 min Winter	1.685	0.0	4680		
8640 min Winter	1.467	0.0	5448		
10080 min Winter	1.306	0.0	6248		
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8 Westleigh House Denby Dale Huddersfield	Ramsden Farm Plot 7	
Date 15/01/2025 15:41 File SOAKAWAY PLOT 7.SRCX	Designed by Sarah Griggs Checked by	
Micro Drainage Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Shortest Storm (mins)	15
Ratio R	0.302	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.020

Time (mins)		Area
From:	To:	(ha)
0	4	0.020

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8 Westleigh House Denby Dale Huddersfield	Ramsden Farm Plot 7	
Date 15/01/2025 15:41 File SOAKAWAY PLOT 7.SRCX	Designed by Sarah Griggs Checked by	
Micro Drainage		Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 98.800

Cellular Storage Structure

Invert Level (m) 97.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.02448 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.02448

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	24.0	24.0	0.801	0.0	40.0
0.800	24.0	40.0			

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8 Westleigh House Denby Dale Huddersfield		Ramsden Farm Plot 7			
Date 15/01/2025 15:48 File Permeable Pavement plot...		Designed by Sarah Griggs Checked by			
Micro Drainage		Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+45%)					
Half Drain Time : 99 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	98.363	0.053	0.2	1.0	0 K
30 min Summer	98.386	0.076	0.2	1.4	0 K
60 min Summer	98.407	0.097	0.2	1.7	0 K
120 min Summer	98.422	0.112	0.2	2.0	0 K
180 min Summer	98.426	0.116	0.2	2.1	0 K
240 min Summer	98.426	0.116	0.2	2.1	0 K
360 min Summer	98.423	0.113	0.2	2.0	0 K
480 min Summer	98.416	0.106	0.2	1.9	0 K
600 min Summer	98.409	0.099	0.2	1.8	0 K
720 min Summer	98.401	0.091	0.2	1.6	0 K
960 min Summer	98.387	0.077	0.2	1.4	0 K
1440 min Summer	98.366	0.056	0.2	1.0	0 K
2160 min Summer	98.353	0.043	0.2	0.8	0 K
2880 min Summer	98.346	0.036	0.1	0.7	0 K
4320 min Summer	98.338	0.028	0.1	0.5	0 K
5760 min Summer	98.333	0.023	0.1	0.4	0 K
7200 min Summer	98.329	0.019	0.1	0.3	0 K
8640 min Summer	98.327	0.017	0.1	0.3	0 K
10080 min Summer	98.325	0.015	0.1	0.3	0 K
15 min Winter	98.372	0.062	0.2	1.1	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	121.169	0.0	17		
30 min Summer	83.539	0.0	32		
60 min Summer	55.087	0.0	60		
120 min Summer	35.030	0.0	96		
180 min Summer	26.417	0.0	130		
240 min Summer	21.426	0.0	164		
360 min Summer	15.988	0.0	232		
480 min Summer	12.960	0.0	300		
600 min Summer	11.001	0.0	366		
720 min Summer	9.615	0.0	430		
960 min Summer	7.767	0.0	550		
1440 min Summer	5.734	0.0	780		
2160 min Summer	4.222	0.0	1128		
2880 min Summer	3.391	0.0	1496		
4320 min Summer	2.485	0.0	2208		
5760 min Summer	1.997	0.0	2936		
7200 min Summer	1.685	0.0	3672		
8640 min Summer	1.467	0.0	4408		
10080 min Summer	1.306	0.0	5112		
15 min Winter	121.169	0.0	17		
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8 Westleigh House Denby Dale Huddersfield		Ramsden Farm Plot 7			
Date 15/01/2025 15:48 File Permeable Pavement plot...		Designed by Sarah Griggs Checked by			
Micro Drainage		Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+45%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	98.398	0.088	0.2	1.6	0 K
60 min Winter	98.423	0.113	0.2	2.0	0 K
120 min Winter	98.439	0.129	0.2	2.3	0 K
180 min Winter	98.442	0.132	0.2	2.4	0 K
240 min Winter	98.441	0.131	0.2	2.4	0 K
360 min Winter	98.433	0.123	0.2	2.2	0 K
480 min Winter	98.421	0.111	0.2	2.0	0 K
600 min Winter	98.409	0.099	0.2	1.8	0 K
720 min Winter	98.397	0.087	0.2	1.6	0 K
960 min Winter	98.376	0.066	0.2	1.2	0 K
1440 min Winter	98.356	0.046	0.2	0.8	0 K
2160 min Winter	98.345	0.035	0.1	0.6	0 K
2880 min Winter	98.338	0.028	0.1	0.5	0 K
4320 min Winter	98.331	0.021	0.1	0.4	0 K
5760 min Winter	98.327	0.017	0.1	0.3	0 K
7200 min Winter	98.324	0.014	0.1	0.3	0 K
8640 min Winter	98.322	0.012	0.0	0.2	0 K
10080 min Winter	98.321	0.011	0.0	0.2	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	83.539	0.0	31		
60 min Winter	55.087	0.0	60		
120 min Winter	35.030	0.0	112		
180 min Winter	26.417	0.0	140		
240 min Winter	21.426	0.0	180		
360 min Winter	15.988	0.0	254		
480 min Winter	12.960	0.0	324		
600 min Winter	11.001	0.0	392		
720 min Winter	9.615	0.0	456		
960 min Winter	7.767	0.0	570		
1440 min Winter	5.734	0.0	780		
2160 min Winter	4.222	0.0	1144		
2880 min Winter	3.391	0.0	1500		
4320 min Winter	2.485	0.0	2244		
5760 min Winter	1.997	0.0	2936		
7200 min Winter	1.685	0.0	3624		
8640 min Winter	1.467	0.0	4376		
10080 min Winter	1.306	0.0	5144		
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8 Westleigh House Denby Dale Huddersfield	Ramsden Farm Plot 7	
Date 15/01/2025 15:48 File Permeable Pavement plot...	Designed by Sarah Griggs Checked by	
Micro Drainage Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Shortest Storm (mins)	15
Ratio R	0.302	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.006

Time (mins)		Area
From:	To:	(ha)
0	4	0.006

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8 Westleigh House Denby Dale Huddersfield	Ramsden Farm Plot 7	
Date 15/01/2025 15:48 File Permeable Pavement plot...	Designed by Sarah Griggs Checked by	
Micro Drainage Source Control 2020.1.3		

Model Details

Storage is Online Cover Level (m) 98.800

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.02448	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	16.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	98.310	Membrane Depth (m)	0

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